

Appendix 7:

In re Wright, 343 F.2d 761, 145 U.S.P.Q. 182 (C.C.P.A. 1965)

145 U.S.P.Q. 182
52 C.C.P.A. 1185, 343 F.2d 761
(Cite as: 145 U.S.P.Q. 182)

Page 1

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In re WRIGHT

Court of Customs and Patent Appeals

Appl. No. 7218

Decided Apr. 15, 1965

United States Patents Quarterly Headnotes

PATENTS**[1] Amendments to patent application--New matter (§ 13.5)**

Amendments to specification are not new matter where there merely render explicit what had been implicitly disclosed originally; all new language is not ipso facto new matter.

PATENTS**[2] Patentability -- Anticipation -- Patents--In general (§ 51.2211)**

It is no moment that reference patent has been assigned to assignee of instant application or that applicant was familiar with operation and advantage achieved by device of reference.

PATENTS**[3] Patentability -- Anticipation -- Combining references (§ 51.205)**

Fact that incorporating device of one reference patent into device of another reference patent would not provide every feature of claimed device does not meet Patent Office's position that claimed invention would be obvious to one of ordinary skill in the art with these patents before him; court is concerned with what patents disclosed, more particularly what they suggest, without regard to what patentees consider to be their inventions; issue is not whether applicant's apparatus has been fully met but whether claimed apparatus has been clearly suggested.

PATENTS**[4] Patentability--Adding or subtracting parts (§ 51.05)**

Finding that elimination of specific element and its function would be an obvious expedient is based upon a determination of obviousness under 35 U.S.C. 103, not upon a mechanical rule, which court is asked to extract from In re Karlson, 136 USPQ 184, about omission of element and its function from known combination being obvious if remaining elements perform same function as before; language to this effect in Karlson case was not intended to short-circuit wording of section 103.

PATENTS**[5] Patentability--Aggregation or combination--In general (§ 51.151)**

Patentability depends upon obviousness of overall combinations, not of individual unclaimed elements thereof.

PATENTS**[6] Patentability--Invention--In general (§ 51.501)****Patentability--Substitution of equivalents (§ 51.65)**

Although expedients which are functionally equivalent to each other are not necessarily obvious in view of one another, they might be; where functional equivalence is not found, they may or may not be obvious; test of obviousness is applied to each set of facts as it arises.

PATENTS**Particular patents--Regulator**

Wright, Afterburner Fuel Regulator Responsive to Compressor Discharge Absolute Pressure, claims 25 to 28 of application allowed; claims 15 to 24 refused.

***183** Appeal from Board of Appeals of the Patent Office.

Application for patent of Alexander M. Wright, Serial No. 688,459, filed Oct. 7, 1957; Patent Office Division 18. From decision rejecting claims 15 to 28, applicant appeals. Affirmed as to claims 15 to 24; reversed as to claims 25 to 28.

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145 U.S.P.Q. 182
 52 C.C.P.A. 1185, 343 F.2d 761
 (Cite as: 145 U.S.P.Q. 182)

Page 2

A. M. PRENTISS, West Hartford, Conn., for appellant.

CLARENCE W. MOORE (JERE W. SEARS of counsel) for Commissioner of Patents.

Before RICH, Acting Chief Judge, MARTIN, SMITH, and ALMOND, Associate Judges, and KIRKPATRICK, Judge. [FNa1]

RICH, Judge.

This appeal is from the decision of the Patent Office Board of Appeals, adhered to on reconsideration, affirming the rejection of claims 15 through 28 of application serial No. 688,459, filed October 7, 1957, for "Afterburner Fuel Regulator Responsive to Compressor Discharge Absolute Pressure." No claims are allowed.

The Invention

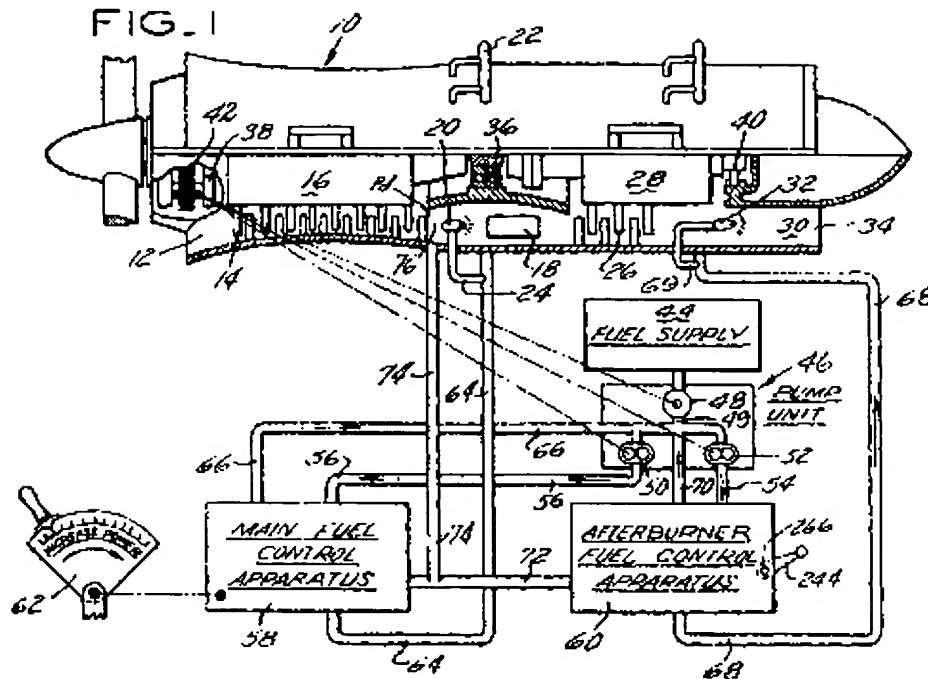
The invention relates to fuel control apparatus for aircraft turbojet engines having as "afterburner" combustion chamber, supplemental to and on the discharge side of, a "main" combustion chamber for reheating exhaust gases and thereby increasing the jet reaction thrust of the engine when maximum power output is desired, such as on take-off. As explained in the specification--

Engines of this type usually comprise, as principal elements, an air inlet, an air compressor, one or more main combustion chambers having a series of burner nozzles through which the main fuel supply is fed, a gas turbine, a supplementary combustion chamber also having a series of burner nozzles through which the supplementary fuel supply is fed, and a tail pipe for discharging the combustion gases to the atmosphere in the form of a jet. Associated with the engine are a main fuel supply system, including a fuel pump and control apparatus, for delivering fuel to the main combustion chambers, and a supplementary fuel supply system, including a fuel pump and control apparatus, for delivering fuel to the afterburners in the afterburner

combustion chamber. This invention is particularly concerned with the afterburner fuel control apparatus which *184 controls the afterburner fuel flow as a preselected function of the compressor discharge absolute pressure.

The specification goes on to say the "invention consists in the *combination and arrangement of elements* hereinafter described and illustrated * * *." (Emphasis ours.)

Appellant's Figure 1, reproduced below since one of the two issues presented by the appeal has a direct bearing thereon, diagrammatically shows a turbojet aircraft engine with its associated main fuel supply and afterburner fuel supply system, including appellant's "control" apparatus, and the principal connections therebetween.



The main elements are: a supporting casing 10, an air inlet 12, a multistage air compressor 14 having a rotor shaft 16, one of a number of main combustion chambers 18, one of a corresponding number of main fuel burner nozzles 20, connected to a generally circular fuel manifold 22 by means of a conduit 24, a multistage turbine 26 having a rotor shaft 28 connected to compressor rotor shaft 16; an afterburner combustion chamber 30, one of a plurality of afterburner fuel nozzles 32, a tail pipe 34 for discharging combustion exhaust; a center bearing 36 and end bearings 38 and 40 supported by casing 10, and a gear train 42 connected to shaft 16 for operating the fuel pumps and other accessories at a speed proportional to the engine speed.

The fuel supply system includes a supply tank 44 connected to a fuel pump unit 46 comprising a centrifugal pump 48, connected by a conduit 49 in series with a pair of parallel, positive displacement pumps 50 and 52, which supply fuel through conduits 56 and 54, respectively, to a main fuel control apparatus 58 and an afterburner fuel control apparatus 60. All three pumps 48, 50, and 52 are connected to gear train 42 as shown by the broken lines, whereby they are driven at a speed

proportional to engine speed. Fuel, controlled by a pilot's manual control 62, is supplied by main fuel control 58 through conduits 64 and 24 to nozzles 20 in the main combustion chamber 18 for the operation of turbine 26; and fuel not required by the turbine is returned from main fuel control 58, through a conduit 66, to conduit 49 on the inlet side of pump 50.

Similarly, fuel at a regulated rate is supplied by the afterburner fuel control 60, through conduits 68 and 69, to afterburner nozzles 32; and fuel not required for afterburning is returned from afterburner fuel control 60, through a conduit 70, to conduit 49 on the inlet side of pump 52.

***185 Appellant's brief says:**

As shown in Fig. 1 of the drawings * * * applicant's invention, broadly comprehended, comprises an afterburner fuel control apparatus 60, for regulating the fuel flow to afterburners 32 in afterburner combustion chamber 30, which is used in operative association with a main fuel control apparatus 58 for regulating the fuel flow to main burner nozzles 20 in main combustion chamber 18. [Emphasis ours.]

145 U.S.P.Q. 182
 52 C.C.P.A. 1185, 343 F.2d 761
 (Cite as: 145 U.S.P.Q. 182)

Page 4

One of the basic requirements for fuel control apparatus for turbojet engines is that the total fuel flow to the engine should always bear a pre-selected, definite, scheduled ratio to the weight [mass?] air flow through the engine, under all operating conditions; and since the total fuel flow to the engine consists of the fuel flow to the main burners 20, and the fuel flow to the afterburners 32, the regulating of the main fuel flow by main control apparatus 58 must be fully coordinated with the regulation of the afterburner fuel flow by afterburner control apparatus 60. This coordination of fuel flows is obtained by the * * * arrangement of elements * * * shown in Fig. 1 * * *

Since one of the cardinal features of applicant's invention is regulation of the fuel flow to the main combustion chamber and the afterburner, in accordance with the rate of mass air flow through the engine, and since compressor discharge absolute pressure is a measure of said air flow, it is essential that said pressure be the sole control parameter that automatically regulates said fuel flow, because any modification of said pressure would cause said fuel flow to be not in accordance with said air flow. Since applicant's invention is particularly concerned with apparatus for regulating the fuel flow to the afterburner, the main fuel control apparatus is involved only to the extent that it cooperates in association with the afterburner control apparatus (as shown in Fig. 1), the details of construction of the main control apparatus form no part of applicant's invention, beyond the arrangement whereby (as shown in Fig. 1), it *automatically regulates the fuel flow to the main combustion chamber*, in accordance with same control parameter as the afterburner fuel control (i.e. compressor discharge absolute pressure). Accordingly, the details of construction of the main fuel control apparatus will not be further described herein since they may be any combination and arrangement of elements that operate to regulate the fuel flow to the main combustion chamber in accordance with the compressor discharged absolute pressure, as for the example of a combination and arrangement of pertinent elements similar to those of the afterburner fuel control apparatus, as hereinafter described, and illustrated in the

drawings * * *.

The afterburner fuel control apparatus 60, the drawing of which is full of complex detail and not reproduced here since it is believed unnecessary for an understanding of the issues, comprises three principal parts: (1) a fuel by-pass valve which maintains a constant metering head across a variable-area, contoured, fuel metering valve; (2) the metering valve itself, together with its positioning mechanism for varying the flow area through the valve as a preselected function of the compressor discharge absolute pressure; and (3) a shut-off valve actuated by a solenoid and by a manual transfer valve, which cuts off all fuel flow to the afterburners when they are not in use.

More specifically, the afterburner fuel flows from the pump 52 to the metering valve, which is positioned as a function of the compressor discharge by means of a "nutcracker amplifier" arrangement. Any change in discharge pressure from the compressor is transmitted to a chamber in a bellows, which is opposed by a second evacuated chamber in the bellows, thereby causing movement of the bellows partition separating the two chambers. The signal thus created is transmitted to the "nutcracker amplifier," an arrangement of two parallel tracks or "links," one fixed and the other rotatable over a fulcrum in accordance with (a) tension on an adjustable spring connected to one end of the track and (b) movement of a rod connecting the other end of the track with the bellows. The amplifier actuates a rod, which moves a servo valve, which, in turn, controls the flow of fluid to one or the other side of a piston attached to the metering valve by means of a shaft. Movement of the piston thereby positions the metering valve, and the direction of movement of the piston is determined by the direction of movement of the servo valve. The direction of movement of the servo valve depends on whether an *increase* or a *decrease* in compressor discharge pressure has occurred. The amplifier also responds to a feedback signal from the metering valve, thereby establishing *186 an equilibrium in the system after each change in compressor discharge pressure.

A pressure drop regulating valve maintains the pressure drop across the metering valve constant by bypassing a certain amount of fuel around the pump 52 via conduit 70. The pressure downstream of the

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145 U.S.P.Q. 182
 52 C.C.P.A. 1185, 343 F.2d 761
 (Cite as: 145 U.S.P.Q. 182)

Page 5

metering valve is sensed and the regulating valve then operates to apply the necessary correction, i.e. bypass, to establish a constant pressure differential across the metering valve. A detailed description of the structure of the pressure drop regulating valve, as well as the shut-off valve mechanism, will not be set forth.

One point of novelty in the invention is alleged to reside in the metering valve being contoured "so as to give the same difference in the rate of fuel flow for the same difference in the compressor discharge absolute pressure (P_{subd}), throughout the operating range of the engine * * *." A further point of novelty is described in the specification as follows:

One of the principal novel features of my improved afterburner fuel control is the *much higher sensitivity* in the response of the metering valve positioning means to changes in compressor discharge absolute pressure, at low values than at high values of said pressure * * *. *This sensitivity performance is one of the striking features* of the type of nutcracker amplifier shown in Figure 2; the advantage being approximately equal percentage sensitivity over the operating range of the fuel control. [Emphasis ours.]

The Claims

Base claim 15, upon which the remaining claims on appeal depend, reads:

15. For use with an aircraft turbojet engine having an air compressor, a main combustion chamber, a gas turbine, an afterburner combustion chamber for reheating the exhaust gases from said turbine, a fuel pump for supplying fuel to said main and afterburner chambers, and a main fuel control for automatically regulating the supply of fuel to said main combustion chamber solely in accordance with the unmodified absolute discharge pressure of said compressor; an afterburner fuel control apparatus for controlling the total flow of fuel from said pump to said afterburner chamber solely in accordance with said pressure, comprising a fuel flow metering valve, first means, actuated by said pressure, for varying the flow area

through said valve solely in accordance with varying values of said pressure throughout the operating range of said apparatus; and second means for maintaining a constant metering head across said valve, throughout the operating range of said apparatus.

Claim 16 in part recites "wherein said second means includes a by-pass valve for returning fuel not passing through said metering valve to the inlet side of said pump * * *," and certain functional features of said bypass valve.

Claim 17 identifies "a movable element" as part of said "first means," e.g., the bellows partition, and also includes a "third means, actuated by said element, for varying the position of said [metering] valve * * *."

Claim 18 is dependent on claim 17 and further qualifies the "third means" by reciting means for making the ratio of incremental change in the flow area of the metering valve to the original value of the flow area a constant for a given increment of change in the position of the valve, throughout the range of movement of the valve.

Claim 19 is dependent on claim 18 and recites the contoured metering valve producing a flow which is a straightline function of the compressor discharge pressure.

Claim 20 is dependent on claim 17 and recites a "fourth means" within the third means "for amplifying the ratio between the movement of said element and the resulting movement of said valve."

Claim 21 is dependent on claim 20 and further qualifies the fourth means to include "means for restoring the equilibrium of the system * * * after any movement of said valve by said element."

Claims 22-24 are all dependent on claim 19 and add limitations relating to various manual adjustments, termed in the specification "factory adjustments" and a "Field Slope Adjustment." These adjustments do not change during flight, but do affect the overall performance of the aircraft while in flight.

Claims 25-28 have been rejected solely on the ground they include matter for which there is

145 U.S.P.Q. 182
 52 C.C.P.A. 1185, 343 F.2d 761
 (Cite as: 145 U.S.P.Q. 182)

Page 6

allegedly no basis in the original disclosure. At one time these claims were deemed allowable, but the allowance was withdrawn by reason of an amendment to base claim 15.

The New Matter Rejection

During prosecution, in an effort to overcome a rejection on prior art, appellant amended claim 15 to include the terms "solely" and "unmodified" (first *187 occurrences only) in describing the manner of fuel control for the main combustion chamber. The examiner raised the objection of lack of antecedent basis in the original disclosure, and an issue arose which the board discussed as follows:

The essential issue with respect to the rejection of the claims as based on an inadequate disclosure, and the rejection of the claims on the prior art relates to the nature of the control parameter. It is strongly urged by appellant that the limitations relating to the feature that the fuel controls are automatically regulated "solely in accordance with the unmodified absolute discharge pressure of said compressor" represent the exact nature of appellant's control parameter that determines the basic philosophy and fundamental mode of operation of his invention.

We agree with the examiner that the original specification and drawings do not show any details of the main fuel control whereby only unmodified absolute discharge pressure regulates the main fuel supply. While the original disclosure did state that the fuel is regulated in accordance with the rate of mass air flow through the engine as measured by the compressor discharge absolute pressure, we find no statement that it is solely so regulated and that other parameters, such as fuel pressure do not modify it. The examiner has called attention to the patent to Lee, which shows that additional control parameters may be used in a fuel control.

While the prior art does not show the main fuel control automatically regulated solely in accordance with the unmodified absolute discharge pressure, we do not give this limitation any patentable weight since the

limitations of "solely" and "unmodified" are not supported in the original disclosure. There being no basis in the original disclosure for the limitations which are now urged to be critical, we do not consider such limitations as being of patentable significance in the claims of this application.

We believe the examiner and board have misconstrued at least two portions of the original disclosure.

First, Fig. 1 shows the discharge pressure of compressor 14 to be transmitted unmodified from chamber 76 through conduits 74 and 72 to both the main fuel control 58 and the afterburner fuel control 60. No alterations to this pressure are shown. The drawing communicates as clearly as possible the idea of transmitting *unmodified* compressor discharge pressure to the respective fuel control apparatuses. The figure clearly shows that the only control entity, other than discharge pressure, is a manual control 62, which is applied to the main fuel control apparatus 58, but this feature has nothing to do with appellant's invention. Of course, the aircraft is subject to various pilot *controls*, including fuel control, at times such as on take-off and landing, but appellant's invention is concerned with *regulating* the fuel as a function of mass air flow through the compressor during flight. As the mass air flow changes, for example by a change in altitude or for any other reason, the rate of fuel flow to the main burner and to the afterburner is adjusted accordingly. Furthermore, this "regulating" is shown to be *automatic* since it occurs without the aid of external manual influences.

Second, we believe the board erred in misconstruing the following passage from the specification, which all agree constituted a portion of the *original* disclosure:

Both the main and afterburner fuel controls are connected by conduits 72 and 74 with the compressor discharge chamber 76, whereby *the fuel supplied by both controls is regulated in accordance with the rate of mass air flow through the engine, as measured by the compressor discharge absolute pressure (P sub d) in chamber 76.*

[Emphasis ours.]

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145 U.S.P.Q. 182
 52 C.C.P.A. 1185, 343 F.2d 761
 (Cite as: 145 U.S.P.Q. 182)

Page 7

We understand this statement to say that the fuel flow to the engine from both control apparatuses 58 and 60 is automatically regulated (as distinguished from the manual control 62) by the *same* control parameter and that this parameter is compressor discharge absolute pressure. Since the compressor discharge pressure is transmitted *unmodified* from chamber 76 to *both* control apparatuses 60 and 58, it follows that fuel flow *to the engine* from both apparatuses is automatically regulated by unmodified, compressor discharge absolute pressure.

We believe further that appellant's specification as filed discloses that fuel flow to the engine is automatically regulated *solely* by unmodified, compressor discharge absolute pressure. Whereas the board fails to find any statement that it is so regulated and that other parameters, such as fuel pressure, do not modify it, we fail to find that such other *188 parameters are at all intended to be included. To assume that parameters, other than compressor discharge absolute pressure, *may* control the fuel flow in appellant's invention, is to indulge in unwarranted speculation. Appellant's drawings do not show them, the specification does not describe them or even suggest that they are present, and we are not willing to conclude that they are. To do so would be asking future applicants to expressly negate all features which, although perhaps common in the art, are not intended to be part of the disclosure. Considering the overall operation of the invention, as *originally* disclosed in the specification and drawings, we agree with appellant that the regulation of fuel flow *solely* by unmodified, compressor discharge pressure was inherently disclosed therein.

In summary, finding no basis in the original specification or drawings to indicate that appellant intended either fuel control apparatus to be *regulated*, as opposed to being controlled which is what manual device 62 does, in any way other than *automatically* and by any parameter other than *unmodified* compressor discharge absolute pressure, we hold that these concepts were inherently disclosed in the application as filed and the rejection of claims 15-28 on grounds of inadequate disclosure is reversed.

An ancillary matter is the question of the propriety of the examiner's and board's refusal [FN1] to enter appellant's proposed amendment

of December 16, 1960. The full text of the change sought to be effected by this amendment does not appear in the printed record, and some confusion exists as to the relationship of this amendment to an amendment filed by appellant on October 3, 1960. The October 3 amendment also contained additions to the specification, some or all of which are printed in the record as part of the specification and which the solicitor's brief, in a footnote, refers to as "prejudicial to the Commissioner's new matter position * * *." Under the circumstances, we are unable to rule specifically on entry of the December 16, 1960 amendment per se. However, we have studied the four passages, indicated in the solicitor's brief as having been stipulated as not part of the original specification, but which nevertheless appear in the record, and conclude that these passages do *not* add "new matter" to the specification. We reach this conclusion primarily for the reasons above indicated in regard to the amendment of base claim 15 to recite the terms "solely" and "unmodified." [1] We feel that the amendments to the specification merely render explicit what had been implicitly disclosed originally, and, while new *language* has certainly been added, we are not prone to view all new "language" ipso facto as "new matter."

The Art Rejection

Claims 15-24 were rejected as unpatentable over various combinations of the following prior art:

Hooker, 2,555,445, June 5, 1951.

Mock, 2,581,275, Jan. 1, 1952.

Lee II, 2,675,674, Apr. 20, 1954.

Chandler et al., 2,700,275, Jan. 25, 1955.

Davies et al. 2,742,755, Apr. 24, 1956.

Watson et al., 2,764,868, Oct. 2, 1956.

Thorpe et al., 2,841,957, July 8, 1958.

Porter, 2,909,896, Oct. 27, 1959.

The principal rejection is that of base claim 15 "as

145 U.S.P.Q. 182
 52 C.C.P.A. 1185, 343 F.2d 761
 (Cite as: 145 U.S.P.Q. 182)

Page 8

being unpatentable over Chandler in view of Davies."

Chandler shows a turbojet engine arrangement generally similar to that in appellant's Fig. 1. The respective fuel flows to the engine from the main fuel control and from the afterburner fuel control are *regulated* in accordance with the pressure *rise* across the air compressor. In the afterburner fuel control, the fuel flow to the engine is regulated by a valve which functions in accordance with changes in this pressure rise. The pressure differential across the valve itself is maintained constant by means of another valve whose operation is subject to this pressure differential and a constant rate spring.

Davies is directed to a fuel system for pilot burners in gas-turbine engine reheat equipment and shows controlling the total fuel flow to an afterburner in response to compressor discharge pressure which, in turn, is shown to be a *function* of the mass air flow through the engine. Appellant agrees with this analysis of Davies but contends, inter alia, that Davies does not thereby show total fuel flow to his afterburner in *accordance with* compressor *189 discharge pressure, presumably meaning "solely" in accordance with this pressure.

In regard to the art rejection, the board said:

The rejection of the claims as being unpatentable over the prior art is based essentially on the combination of the Chandler et al. and Davies et al. patents. The principal distinction over the Chandler et al. patent resides in the fact that in Chandler et al. the main fuel and afterburner fuel controls are automatically actuated in response to the difference between the pressure discharge and inlet pressures, whereas in the instant application appellant uses the parameter of absolute compressor discharge pressure to control fuel flow. The examiner held that the distinction between these two control parameters was not patentable especially in view of Davies et al. Davies et al. show the expedient of controlling afterburner fuel flow by absolute compressor discharge pressure.

We agree with the examiner that it would not be patentable to utilize absolute compressor discharge pressure as suggested by Davies et al.

in lieu of the pressure rise control signal in Chandler et al.

In response, appellant argues in his main brief that the substitution of absolute compressor discharge pressure, *as employed by Davies*, for the pressure rise across the compressor as employed by Chandler to automatically regulate the fuel flow to the afterburner would not result in a fuel control apparatus meeting the terms of the claims. We note that all the comparisons there made, showing novelty of the present invention, are made between the claims on appeal and Davies. Appellant also argues that one of the cardinal features of his invention is a "marked *simplification* of afterburner fuel controls, in comparison with most of the prior art" by eliminating *fuel pressure* as a parameter for regulating fuel flow to an afterburner, as employed by Davies for example. It is not until we approach the end of the brief that we find any attempt to establish patentability over Chandler, the primary reference. Appellant there says:

(5) The first substantial step in simplifying afterburner controls was achieved by the Chandler patent of record, which eliminated *fuel pressure*, as a parameter for regulating afterburner fuel flow, by using a combination of *air pressures* (i.e. the pressure *rise* across the compressor), to regulate afterburner fuel flow.

The second substantial step in simplifying afterburner fuel controls was achieved by applicant's invention, which *eliminated compressor inlet air pressure* as a *factor* in the *parameter* for afterburner fuel regulating, thus leaving only *one* air pressure line from the compressor to the regulator.

(6) The Chandler patent of record, is assigned to the same assignee as the application involved in the appeal at bar, and applicant was familiar with the operation and advantage achieved by the Chandler fuel control. The objective of *further simplifying* Chandler's control was clearly not to be found in turning back to prior art devices, such as Davies, which used *fuel pressure*, as well as compressor pressure, as parameters to regulate afterburner fuel flow, since such prior art controls were obviously far more complicated than Chandler's control.

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145 U.S.P.Q. 182
 52 C.C.P.A. 1185, 343 F.2d 761
 (Cite as: 145 U.S.P.Q. 182)

Page 9

[2] First, it is of no moment that the Chandler patent has been assigned to the assignee of the subject application or that appellant was actually familiar with the operation and advantage achieved by the Chandler fuel control. Second, we do not understand appellant's contention that simplification of Chandler's control could not be found in turning "back" to devices such as Davies for the Davies patent was applied for in 1950, nearly two years after Chandler filed, and issued approximately 15 months after the Chandler patent issued. In any case, both patents are prior art and must be considered together. To be sure, Davies' device may be more complicated than Chandler's in certain respects, but we believe appellant has overlooked other disclosures in Davies which, in our opinion, *suggest* the claimed invention.

Appellant says, in effect, that following the "first substantial step" in simplifying fuel controls taken by Chandler, that of eliminating fuel pressure as a parameter, the next substantial step was the present invention which, stripped to its fundamentals, is apparatus using absolute discharge pressure as a sole parameter in regulating fuel flow, and that this latter step was unobvious.

We cannot agree with the contention that appellant's invention was unobvious. Davies says:

It is known that when a sonic velocity occurs in the turbine nozzles of a gas-turbine engine, *the mass flow* *190 of air which passes through the engine is proportional to the absolute delivery pressure of the compressor of the engine *if the turbine inlet temperature is constant* * * *. [Emphasis ours.]

Davies goes on to say:

Since in preferred arrangements according to the invention, the fuel delivery to the pilot burner is proportional to the absolute delivery pressure of the compressor, it is also proportional to the mass flow of air flowing through the engine * * *.

[3] While appellant is correct in contending that incorporating the Davies *device* into the Chandler *device* would not provide every feature of the claimed device, we believe this contention fails to

meet the issue before us. The Patent Office position is that the claimed invention would be obvious to one of ordinary skill in the art with the Chandler and Davies patents before him. Hence, we are concerned with what these patents *disclose*, more particularly what they suggest, without regard to what the respective patentees consider to be their inventions. The issue is not whether appellant's apparatus has been "fully met" but rather whether the claimed apparatus has been clearly suggested. We believe it has, since the quoted passages from Davies tell one of ordinary skill in the art that compressor discharge pressure can be used to regulate automatically fuel flow in accordance with mass air flow through the engine.

[4] Finally, we believe the word "solely" does not so limit claim 15 as to render it patentable. The afterburner fuel control of Chandler is governed by two parameters, pressure differential across the compressor and tail pipe temperature. We agree with the solicitor that "the elimination of the temperature parameter for the afterburner fuel control of Chandler * * * together with its tailpipe safeguarding function, would be an obvious expedient," but we hasten to add that this finding is based upon a *determination of obviousness under section 103* and not upon a mechanical rule, which the solicitor would have us extract from *In re Karlson*, 50 CCPA 908, 311 F.2d 581, 136 USPQ 184, about the omission of an element and its function from a known combination being obvious if the remaining elements perform the same function as before. Language to this effect in *Karlson* was never intended to short-circuit the clear wording of 35 U.S.C. 103. The same reasoning applies to the word "solely" in describing the regulating of fuel flow to the main combustion chamber.

Claims 16 and 17 were rejected "for substantially the same reasons as claim 15 * * * in view of Thorpe who teaches using a by-pass valve * * *," the specific features of this valve being set forth and allegedly teaching appellant's modifications of the apparatus defined by claim 15. Claims 18, 19, and 24 were rejected for substantially the same reason as claim 17 "in view of Mock"; claims 20 and 21 were rejected for substantially the same reasons as claim 17 "in view of Watson"; and claims 22 and 23 were rejected for substantially the same reasons as claim 19 "in view of Hooker." The Lee patent was

145 U.S.P.Q. 182
 52 C.C.P.A. 1185, 343 F.2d 761
 (Cite as: 145 U.S.P.Q. 182)

Page 10

used to provide a more detailed analysis of a main fuel control apparatus, Chandler's main fuel control having been indicated as corresponding to that of Lee's. The Porter reference appears to have been dropped after the final rejection. Each additional reference was used to provide either a teaching or suggestion of the particular modification of the base claim, or to show that such modification constitutes "merely a matter of design choice."

The examiner's answer says:

Applicant relies on the patentability of the base claim 15 to determine the patentability of claims 16-24 over the art as applied. Throughout the prosecution of the case applicant has followed this same approach and this is taken by the examiner to be an acquiescence to the propriety of the application of these additional references as used against claims 16-24. Accordingly, no additional comment is directed by the examiner as concerns the art rejection of claims 16-24.

While we note that appellant strongly disagrees with the examiner that he has at any time, up to and including the present appeal, *acquiesced* in the propriety of treating all of claims 15-24 together as regards their patentability over the art, we also note that appellant has failed to come forth with an affirmative argument as to why any or all of claims 16-24 are patentable, independently of the patentability of claim 15. Some effort along these lines is demonstrated in appellant's brief before the board, but these arguments for the most part boil down to a reliance on the patentability of base claim 15.

[5] We certainly agree with appellant, however, that claims 16-24 do not *claim the additional feature*, but instead define *combinations*, the combinations being made up of the apparatus set *191 forth in the base claim *and* the additional feature. Patentability depends on the obviousness of the overall *combinations*, not of the individual *elements* of that combination for *they* are not being claimed. We do not agree with appellant, however, that these features are sufficient to render the otherwise *un* patentable combination defined by claim 15 patentable.

Appellant, at oral argument, relied heavily on our

decision in *In re Flint*, 51 CCPA 1230, 330 F.2d 363, 141 USPQ 299, and suggests that we examine the present appeal in light of our decision and rationale there. In *Flint* the invention related to a releasable hold open device for doors which the examiner and board found to be "functionally equivalent" to the prior art device. The appellant therein contended that such a finding, even if correct, did not necessarily render the claimed device unpatentable since the *statutory* test is the obviousness, under 35 U.S.C. 103, of the novel subject matter and not whether the invention is "functionally equivalent" to the art device. We agreed with that contention, saying, 141 USPQ at 302:

Assuming, *arguendo*, that the pin ejection system of appellant and the releasable spring arm taught by Pollack are "functionally equivalent," it does not follow that the former would be "obvious" to one of the ordinary skill in view of the latter. On the contrary, we see no suggestion in Pollack's leaf spring arm and stud construction to employ a spring-loaded pin *directly in the pivot socket* even though the solicitor characterizes such construction as "a slightly different disposition of the pin member" which results in a combination which is "merely the obvious equivalent of that of Pollack." We therefore do not find obviousness.

[6] In *Flint* we also said, citing *In re Scott*, 51 CCPA 747, 323 F.2d 1016, 139 USPQ 297, that "Expedients which are functionally equivalent to each other are not necessarily obvious *in view of* one another." On the other hand they *might* be, and, of course, where "functional equivalence" is not found, they may or may not be obvious. The test of obviousness, therefore, is to be applied to each set of facts as it arises. Under the facts of *this* case, we hold that claims 15-24 define subject matter which *is* obvious within the meaning of section 103.

The rejection of claims 15-28 on the ground of inadequate disclosure is *reversed* and the rejection of claims 15-24 as unpatentable over the art is *affirmed*.

FNal United States Senior Judge for the
 Eastern District of Pennsylvania,

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145 U.S.P.Q. 182
52 C.C.P.A. 1185, 343 F.2d 761
(Cite as: 145 U.S.P.Q. 182)

Page 11

designated to participate in place of Chief Judge Worley, pursuant to provisions of Section 294(d), Title 28, United States Code.

FN1 The examiner's refusal led to the filing of a Petition to the Commissioner, which was denied. Ultimately a second Petition to the Commissioner was filed, in response to which the matter was said to be fully covered by section 608.04(c) of the Manual of Patent Examining Procedure, which says, in effect, that where the alleged new matter is "introduced into" or "affects" the claims, thus necessitating their rejection, the question becomes an appealable one, and should not be considered on petition even though that new matter has been introduced into the specification.

Cust. & Pat.App.

145 U.S.P.Q. 182

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